

## ARNOLD ARBORETUM

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Lindens are the most important of the summer-flowering trees in this climate, and many of the plants in the Arboretum collection are now large enough to flower and to be interesting; although none of them are old enough to show the form and bark of mature trees. Linden trees are very generally distributed in all the temperate regions of the northern hemisphere with the exception of western North America, and, in addition to numerous species, several hybrids are cultivated. All the species are very similar in flower and fruit, and chiefly vary in the size and shape of their leaves, in the presence or absence of hairs on the leaves and branchlets, and in the nature of their hairy covering when it occurs. A fact not easy to explain is the presence in the flowers of all the American species of five petal-like scales opposite the petals and connected with the clusters of stamens, while in the flowers of all the Old World Lindens such scales do not exist. It is almost a universal rule that the trees of eastern North America and eastern Asia are more successful here in cultivation than those of Europe, but an exception is found in the Lindens. All the European species and many of their hybrids flourish here and some of them have grown in Massachusetts to a large size. Of the American species cultivated plants of the northern *T. americana* suffer greatly, especially when used as street trees, from the attacks of the red spider which often badly disfigures the leaves, and the leaves of this tree suffer, too, from various fungal diseases. The silver-leaved *T. heterophylla* from the South may do better in this part of the country but not much is yet known of it as a cultivated tree. There are other Linden trees, natives of the extreme southern states, but none of them have been cultivated except occasionally in southern towns. Judging by the results obtained in the Arboretum none of the

Asiatic Lindens promise to become valuable trees here, although the species recently discovered in western China are still so young that it is not possible to say much about them. Species, however, from Japan, eastern Siberia and Manchuria have been cultivated in the Arboretum for several years, and of these only *T. japonica* and *T. mongolica* have ever grown large enough to flower and produce seeds. The former is a small tree here with gracefully drooping branches and is conspicuous in early spring as the small yellow-green leaves appear a week or two earlier than those of any other Linden in the collection. It is one of the latest species to flower. *T. mongolica* is a small, short-lived tree with small, long-pointed shining leaves and is of no value except as a botanical curiosity. The best plants in the country of this Linden are now in Rochester, New York. The four European species and some of the hybrids between these species, and between them and the American species, all flourish in the northern and middle states; and the largest and handsomest Linden-tree which has been planted in the neighborhood of Boston is a supposed hybrid between the two species of eastern Europe, *T. platyphyllos* and *T. cordata*, and known as *T. vulgaris*, *T. europaea*, *T. intermedia* and *T. hybrida*. Although widely distributed in central Europe, this tree is much less common than either of its supposed parents; this fact and the variation in the size, shape and color of the leaves on different individuals make its hybrid origin possible, but whatever its origin this Linden is an excellent tree to plant here in rich moist soil where abundant space for free development can be allowed to it. The two silver-leaved Lindens of eastern Europe, *T. argentea* and *T. petiolaris*, are distinct and handsome trees which might well be more generally seen in New England plantations. The former, which is common in the forests of Hungary, is a large tree with erect-growing branches forming a compact, round-topped head, and large, erect-growing leaves dark green above and silvery white below. This tree has been a good deal planted in some of the parks in New York City where large and interesting specimens can now be seen. It does not appear to be well known in Massachusetts. *T. petiolaris* is better known in New England, and there are large and beautiful specimens of this tree growing in Newport, Rhode Island. Like those of *T. argentea*, the leaves of this tree are silvery white on the lower surface; they droop, however, on long slender stems and flutter gracefully in the slightest breeze. The branches, too, are drooping and form a narrow open head. *T. petiolaris* is not known in a wild state and is of very uncertain origin. A supposed hybrid of this tree with *T. americana* is one of the handsomest of all Linden trees; it has been called *T. vestita* and *T. hybrida spectabilis*. The leaves are of the size and shape of those of the American parent but are silvery white on the lower surface. The flowers of the earliest of the Lindens, the European *T. platyphyllos*, have been open for several days, and for another month Linden-flowers in the Arboretum will fill the air with fragrance and delight the bees with abundant nectar. The Linden Collection occupies the meadow on the right-hand side of the Meadow Road beyond the Administration Building.

**Sambucus canadensis.** This is the last of the native shrubs to make a conspicuous show of flowers in the Arboretum, and as the corollas of the Laurels begin to fall the wide, flat flower-clusters of the black-fruited Elder begin to whiten. Few native shrubs make a greater



show of flowers and fruits, and the numerous Elders sown by birds on the banks of the Bussey Brook in the valley north of Hemlock Hill, and by the little ponds near the junction of the Meadow and Bussey Hill Roads add much to the beauty of the Arboretum in July. Growing with *Sambucus canadensis* in the Shrub Collection is a form with leaflets deeply divided into narrow segments (var. *acutiloba*) and more curious than beautiful. There are here also a form with yellow fruit (var. *chlorocarpa*), and var. *maxima*, which originated a few years ago in a European nursery and which has flower-clusters three times as large as those of the wild plant and such large and heavy bunches of fruit that the branches can hardly support them. A variety with yellow leaves (var. *aurea*) is also in the collection. More objectionable than many yellow-leaved shrubs because it is hardier and grows more rapidly to a larger size than some of them, this plant now disfigures many European gardens and is too often seen in those of this country.

*Zelkova serrata*, or, as it is more generally known, *Z. keaki*, Keaki being the Japanese name for this tree, is one of the important trees of Japan. Although no longer very common or of a large size in the Japanese forests, it is one of the largest of Japanese trees, for specimens one hundred feet high with trunks from eight to ten feet in diameter are not uncommon in temple gardens and by village roadsides. The wood is more valued by the Japanese than that of any other tree; it is tough, elastic and durable both in the ground and when exposed to the air, and is considered the best building material in the empire. Keaki, however, has now become so scarce that it is not used for building except in temples in which the large, round, light brown, polished columns which support the roof are always made of this wood; it is universally used in the manufacture of jinrikishas, and it is still much employed in cabinet-making and turnery. *Zelkova* is a genus related to *Ulmus*. The leaves resemble those of some of the small-leaved Elms; the male and female organs, however, are in separate flowers on different parts of the branch; the fruit is a small drupe, and the bark is more like that of a Beech-tree than of an Elm-tree. The Keaki is probably worth general cultivation as a timber tree in some parts of the United States. That it can flourish here at least for many years is shown by the trees planted in Warren, Rhode Island, in 1862, by the late Dr. George R. Hall. Thirty years later these trees were fifty feet high with trunks a foot in diameter, and were producing large crops of seeds from which seedling plants were growing spontaneously in large numbers. Two of these seedlings can be seen in the Arboretum in the Celtis Group on the slope below the right-hand side of the Bussey Hill Road above the group of *Sassafras* trees. Here may be seen, too, a young plant of the Caucasian species, *Z. crenata*. This has been a difficult plant to establish in the Arboretum but there is a picturesque old specimen in the Harvard Botanic Garden.

*Hemiptelea Davidii*. Specimens of this interesting tree from northern China, known as the "Prickly Elm," are established in the Celtis Group and larger specimens can be seen in the nursery near the top of Peter's Hill. In foliage this tree also looks like a small-leaved Elm but the branches are furnished with sharp thorns. The flowers are similar to those of the *Zelkova*, but the fruit is slightly winged and distinctly short stalked. Of no particular value as an ornamental

tree, *Hemiptelea* is of much botanical interest as the representative of one of the monotypic genera of trees which are such a conspicuous feature in the flora of China.

***Eucommia ulmoides*.** This, the so-called "Hardy Rubber-tree," which has been of more interest to the energetic newspaper reporter than it can ever be to the manufacturer of rubber goods, is also monotypic. It is a small tree with inconspicuous flowers, and fruits which have some resemblance in shape to those of an Elm-tree. The leaves are thick, dark green, very lustrous, and five or six inches long, and give ornamental value to the tree. *Eucommia* is a native of central and western China where it is cultivated in the neighborhood of houses for the bark which yields a drug valued by the Chinese. The leaves and bark contain an elastic gum but in such small quantities that it can have no commercial significance. *Eucommia* is perfectly hardy and is now well established in the Arboretum. Plants can be seen on the upper side of Azalea Path.

***Magnolia macrophylla*.** This, the last of the Arboretum *Magnolias* to bloom, is now opening its flower-buds. It is a handsome small tree of good habit, and particularly interesting from the fact that of all the trees which grow beyond the tropics it has the largest leaves and the largest flowers. The leaves are from twenty to thirty inches long and from eight to nine inches wide, and are silvery white on the lower surface. The cup-shaped creamy white, fragrant flowers are often a foot in diameter. This southern tree is perfectly hardy in the northern states, but it should be planted in sheltered positions that the delicate leaves may be protected from the wind which tears and disfigures them.

***Tripterygium Regelii*.** This is a near relative of the Bitter Sweet (*Celastrus*), a native of northern Japan and Korea, and one of the plants brought to the Arboretum by Mr. Jack from Korea; it is still rare in gardens. It is a half-climbing shrub with stems sometimes thirty feet long on its native hill sides, long-pointed dark green leaves often six inches long, small white flowers in terminal clusters often ten inches in length, and three-lobed and three-winged fruits rather more than half an inch long. This plant is perfectly hardy here in the Arboretum and began to flower when not more than three feet high. On such small plants the stems are nearly erect and almost self-supporting, but larger plants will need the support of rocks or bushes over which to stray. Specimens of *Tripterygium* can now be seen in flower on Hickory Path near Centre Street and in the Shrub Collection.

***Lonicera Henryi*** is a native of western China and valuable and interesting for, with the exception of *Evonymus radicans* and *Vinca minor*, it is the only vine with evergreen leaves which is hardy in this climate. It has long, dark green, pointed leaves and axillary clusters of flowers which are rose color when they first open but soon become orange-red; they are without odor. On the slopes of its native mountains this plant scrambles over rocks and bushes and, like other climbing Honeysuckles, it will do best when allowed to grow naturally in this way, for none of these Honeysuckles are really happy when they are fastened to a trellis. There is a good specimen of this plant now covered with flowers in the bed of Chinese shrubs on the southern slope of Bussey Hill.